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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MASAYUKI NAYA, TAKASHI KUBO,
TAKASHI ITO, and YOSHIMITSU NOMURA

Appeal 2009-013054
Application 10/053,585
Technology Center 1600

Decided: February 16, 2010

Before ERIC GRIMES, FRANCISCO C. PRATS, and
JEFFREY N. FREDMAN, *Administrative Patent Judges*.

FREDMAN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a surface plasmon resonance measuring chip. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

Statement of the Case

Background

"In metals, if free electrons are caused to vibrate in a group, compression waves called plasma waves will be generated. The compression waves generated in a metal surface and quantized are called surface plasmon" (Spec. 1, ll. 13-16). According to the Specification, "if a light beam strikes the metal film at a specific incidence angle θ_{sp} equal to or greater than a critical angle of incidence at which total internal reflection takes place, evanescent waves having electric field distribution are generated in the sample in contact with the metal film" (Spec. 2, l. 25 to 3, l. 3). The Specification then teaches that "surface plasmon is excited at the interface between the metal film and the sample" (Spec. 3, ll. 3-5). The Specification teaches that

> When the wave vector of the evanescent light is equal to the wave number of the surface plasmon and therefore the wave numbers between the two are matched, the evanescent waves and the surface plasmon resonate and light energy is transferred to the surface plasmon, whereby the intensity of light satisfying total internal reflection at the interface between the dielectric block and the metal film drops sharply. The sharp intensity drop is generally detected as a dark line by the above-mentioned photodetection means.

(Spec. 3, ll. 5-13).

The Claims

Claims 1-12, 14-18, and 22-25 are on appeal. Claim 1 is representative and reads as follows:

> 1. A surface plasmon resonance measuring chip for use in a surface plasmon resonance measurement apparatus constituted of a light source for emitting a light beam; an optical system for making said light beam enter a dielectric block at various angles of incidence so that a condition for total internal reflection is satisfied at an interface between said dielectric block and said metal film; and photodetection means for detecting the intensity of said light beam satisfying total internal reflection at said interface to detect surface plasmon resonance; comprising:
>
> a dielectric block;
>
> a metal film, formed on a surface of said dielectric block, for placing a sample thereon;
>
> wherein said dielectric block is formed as a single block that includes an entrance surface which said light beam enters, an exit surface from which said light beam emerges, and a surface on which said metal film is formed;
>
> said metal film is united with said dielectric block; and
>
> said dielectric block is formed from a synthetic resin in which, when said light beam is p-polarized outside said dielectric block and then strikes said interface, the intensity of an s-polarized component at said interface is 50% or less of the intensity of said light beam at said interface.

The prior art

The Examiner relies on the following prior art references to show unpatentability:

Malmqvist et al.	US 5,492,840	Feb. 20, 1996
Kubo et al.	US 6,597,456 B2	Jul. 22, 2003
Naya et al.	US 6,611,367 B1	Aug. 26, 2003

Natsuume et al., *A New High Heat Resistant, High Clarity, and High Humidity Resistant Polymer For Optical Uses*, 150 MATERIALS RES. SOC'Y SYMP. PROC. 245-250 (1989).

The issues

A. The Examiner rejected claims 1-6 and 14-18 on the ground of nonstatutory obviousness type double patenting over claim 13 of Kubo and Natsuume (Ans. 3-6).

B. The Examiner rejected claims 1-3 under 35 U.S.C. § 102(e) as anticipated over Naya (Ans. 6-7).

C. The Examiner rejected claims 4-6 and 22-25 under 35 U.S.C. § 103(a) as obvious over Naya and Natsuume (Ans. 7-8).

D. The Examiner rejected claims 1-12, 15-18, and 22-25 under 35 U.S.C. § 103(a) as obvious over Malmqvist and Natsuume (Ans. 8-9).

A., C., and D. Obviousness over either Kubo, Naya, or Malmqvist in view of Natsuume

The Examiner finds that Claim 13 of Kubo "differs from the instant invention in not reciting that the dielectric block is composed of a synthetic resin" (Ans. 5). The Examiner finds that Naya differs "in failing to teach a dielectric block composed of polymethylmethacrylate or a cycloolefin

polymer or a cycloolefin copolymer" (Ans. 7). The Examiner finds that Malmqvist differs "in failing to teach using a cycloolefin polymer to support the thin metal film in the sensor unit" (Ans. 8).

The Examiner finds that Natsuume "discloses a polyolefin polymer material (Zeonex) for optical uses. The polyolefin polymer material has high transmittance properties" (Ans. 5). The Examiner concludes that it would have been obvious to "use the polyolefin polymer material of Natsuume et al in the dielectric block of [Kubo] because the polyolefin polymer material of Natsuume et al provides the advantage of having high transmittance properties to support the light beam entering the dielectric block" (Ans. 5). The Examiner finds that "[s]ince the dielectric block of [Kubo], as modified by Natsuume et al, is composed of the same material as the instantly claimed dielectric block, it will possess the same properties - i.e. the intensities of s-polarized component is 50% or less" (Ans. 5-6).

Appellants argue that "claim 1 recites a dielectric block but also requires the dielectric block to include certain structural characteristics, the structural characteristics are such that the s-polarization of light be limited in the dielectric block." (App. Br. 10). Appellants argue that "even though Natsuume discloses the polyolefin polymer Zeonex, the polarization properties and birefringence level of a dielectric *are not dependent only on the material of the dielectric*, as shape and molding/processing conditions are also other factors which would determine the polarization properties and birefringence level of the dielectric" (App. Br. 11). Appellants argue that the "submission under 37 C.F.R. § 1.114 filed on March 19, 2007 clearly demonstrated that Natsuume clearly cannot meet the limitations as claimed.

For example, Reference 3 (of the Rule 1.114 Submission) shows a cycloolefin polymer having a substantial amount of birefringence, indicated by the white portions" (App. Br. 11).

Appellants also argue that "even though Natsuume does disclose a polyolefin polymer Zeonex, Natsuume's Zeonex is not taught or suggested to be capable of having the same properties of the dielectric block as recited by claim 1" (App. Br. 12).

There are three separate obviousness rejections, but they all turn on the same issue:

Have Appellants demonstrated that the Examiner erred in finding that a dielectric block formed from Natsuume's Zeonex polymer would inherently result in reduction of the intensity of an s-polarized component to 50% or less at an interface?

Findings of Fact (FF)

1. The Specification teaches that "the dielectric block is formed from a synthetic resin in which, when the light beam is p-polarized outside the dielectric block and then strikes the interface, the intensity of a s-polarized component at the interface is 50% or less of the intensity of the light beam at the interface" (Spec. 8, ll. 14-19).

2. The Specification teaches that the "dielectric block 11 is formed from PMMA, and in the case of PMMA, the intensity of the s-polarized component is on the order of a few percent of the intensity of the lightbeam 30 at the interface 11a and is therefore reduced to 50 percent or less" (Spec. 29, ll. 22-25).

3. The Specification teaches that "it is difficult to suppress the intensity of the s-polarized component (conversion ratio R) to less than or equal to 50%, less than or equal to 30%, or less than or equal to 10% simply by employing PMMA as the material for the dielectric block 11" (Spec. 30, ll. 12-16).

4. The Specification teaches that "[t]hese conversion ratios R can be realized by applying the method of manufacture of a surface plasmon resonance measuring chip of the present invention, when PMMA is employed" (Spec. 30, ll. 16-18).

5. The Specification teaches that "the material of the dielectric blocks is not limited to PMMA. For example, even if 'ZEONEX 330R', a cycloolefin polymer manufactured by Japan Zeon, is employed, nearly the same effect as the case of PMMA can be obtained" (Spec. 37, ll. 11-14). The Specification teaches that "[f]urther, synthetic resins such as 'ZEONOR', a cycloolefin polymer manufactured by Japan Zeon, and 'ABERU', an ethylene tetracyclododecene cycloolefin polymer manufactured by Mitsui Chemical, may also be employed as the material for the dielectric block" (Spec. 37, ll. 15-19).

6. Claim 13 of Kubo reads:

> A measuring chip for a surface plasmon resonance sensor, comprising: a dielectric block; a metal film layer which is formed on a first face of the dielectric block and is brought into contact with a sample; a light source which emits a light beam; an optical system which causes the light beam to enter the dielectric block through a second face thereof so that the light beam is reflected in total internal reflection at the interface of the dielectric block and the metal film layer and so that various angles of incidence of the light beam to

> the interface of the dielectric block and the metal film layer are obtained; photodetector means which detects attenuation in total internal reflection due to plasmon resonance by detecting the intensity of the light beam which is reflected in total internal reflection and goes outside the dielectric block through a third face thereof; and a sample holder mechanism for holding the sample on the metal film layer; wherein the dielectric block of the measuring chip comprises all the first to third faces and the metal film layer integrally formed on the first face of the dielectric block; and wherein the sample holder mechanism comprises a member which defines above the metal film layer a space which has closed side walls and is flared upward.

(Kubo, col. 16, Claim 13).

7. Natsuume teaches that the "new polyolefin polymer, Zeonex, is an amorphous and transparent hydrocarbon polymer without any polar groups. The polymer has high transmittance, small photo-elasticity coefficient, high glass transition temperature, low water absorption, low water permeability, and easy processing properties" (Natsuume 250).

8. Natsuume teaches that Zeonex "has outstanding characteristics for optical uses" (Natsuume 245).

9. Naya teaches

> a surface plasmon optical modulator element comprising a dielectric material block disposed so that light-to-be-modulated travels through the interior of the dielectric material block and impinges upon one surface thereof at an angle of total reflection, a metal film formed on said one surface of the dielectric material block, a photo-functional film which is formed on the metal film and whose refractive index is changed upon exposure to light, and a modulating light source which projects modulating light onto the photo-functional film.

(Naya, col. 3, ll. 47-56).

10. Naya teaches that "the dielectric material block may be formed of BK7, high refractive index glass, polycarbonate, or the like" (Naya, col. 4, ll. 40-42).

11. Malmqvist teaches "a replaceable sensor unit consisting of a substrate of a dielectric material, for example a glass substrate, which has one of its faces coated with a metal film containing one sensing surface or preferably a plurality of sensing surfaces. Such sensing surfaces have to be functionalized for selective interaction with the desired biomolecules" (Malmqvist, col. 2, l. 66 to col. 3, l. 5).

Principles of Law

"Obviousness-type double patenting … requires rejection of an application claim when the claimed subject matter is not patentably distinct from the subject matter claimed in a commonly owned patent. Its purpose is to prevent an unjustified extension of the term of the right to exclude granted by a patent by allowing a second patent claiming an obvious variant of the same invention to issue to the same owner later." *In re Berg*, 140 F.3d 1428, 1431 (Fed. Cir. 1998).

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) secondary considerations of nonobviousness, if any. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). The Supreme Court has emphasized that "the [obviousness] analysis need

not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

"Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product." *In re Best*, 562 F.2d 1252, 1255 (CCPA 1977). "Whether the rejection is based on 'inherency' under 35 U.S.C. § 102, on 'prima facie obviousness' under 35 U.S.C. § 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products." *Id.* at 1255.

Analysis

Claim 13 of Kubo is directed to a surface plasmon resonance measuring chip which comprises a dielectric block, and a metal film formed on the surface of the dielectric block (FF 6). Similarly, Malmqvist and Naya teach suface plasmon resonance chips (FF 9-11). The Examiner acknowledges that Claim 13 of Kubo "differs from the instant invention in not reciting that the dielectric block is composed of synthetic resin" (Ans. 5). The Examiner makes the same concession regarding Malmqvist and Naya (Ans. 6-8).

Natsuume teaches the polyolefin polymer Zeonex for optical uses, noting that the "polymer has high transmittance, small photo-elasticity

coefficient, high glass transition temperature, low water absorption, low water permeability, and easy processing properties" (Natsuume 250; FF 7). Natsuume specifically teaches that Zeonex "has outstanding characteristics for optical uses" (Natsuume 245; FF 8).

Applying the *KSR* standard of obviousness to the findings of fact, using the Zeonex polymer of Natsuume in the dielectric block of Claim 13 of Kubo represents a combination of known elements which would predictably result in a superior dielectric block (FF 6-8). The same combination would predictably work with the chips of Malmqvist and Naya. Such combinations are merely a "predictable use of prior art elements according to their established functions." *KSR*, 550 U.S. at 417.

Appellants do not dispute the obviousness of combining Claim 13 of Kubo (or Malmqvist or Naya) with Natsuume, but rather argue that "even though Natsuume discloses the polyolefin polymer Zeonex, the polarization properties and birefringence level of a dielectric *are not dependent only on the material of the dielectric*, as shape and molding/processing conditions are also other factors which would determine the polarization properties and birefringence level of the dielectric" (App. Br. 11).

We are not persuaded. First, while the Specification indicates that the method of manufacture may impact the amount of S-polarized light (FF 3-4), the Specification focuses on the material used in forming the dielectric block (FF 1-2). The Zeonex of Natsuume is a cycloolefin polymer just like the cycloolefin polymers such as ZEONEX 330R, ZEONOR and ABERU which are identified by the Specification as superior materials for use in reducing the amount of S-polarized light (FF 5). The Examiner reasonably

finds that "[s]ince the dielectric block of [Kubo], as modified by Natsuume et al, is composed of the same material as the instantly claimed dielectric block, it will possess the same properties" (Ans. 5). We think the Examiner has reasonably established a prima facie case of inherency based upon the identity of the cycloolefin polymers. *See In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990) ("[W]hen the PTO shows sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not.")

Appellants respond to the Examiner's inherency argument by arguing that "[e]vidence of such factors effecting polarization properties and birefringence level were previously submitted in the submission under 37 C.F.R. § 1.114 filed on March 19, 2007" (App. Br. 11).

We have reviewed Appellants' evidence submitted on March 19, 2007, but this evidence is neither in English nor in the form of a Declaration. Thus, we cannot weigh the probative effect of the references because they are not translated into English. We also cannot review Appellants' characterization of these references because this characterization is not evidence, but rather represents attorney argument. *See In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) ("Attorney's argument in a brief cannot take the place of evidence.").

Additionally Appellants state that "[r]eference 3 (of the Rule 1.114 Submission) shows a cycloolefin polymer having a substantial amount of birefringence . . . which would cause a change in polarization. The amount of birefringence shown in Reference 3 is substantial" (App. Br. 11). In this argument, Appellants never state that the change in polarization would not

satisfy the requirement of Claim 1, only that there is a substantial change. Consequently, even based upon Appellants' statements, there is no showing that Natsuume's cycloolefin polymers do not inherently satisfy the requirements of Claim 1.

Appellants argue that "Natsuume's general disclosure of a polyolefin polymer Zeonex would not teach or suggest such a dielectric block with characteristics which are specifically recited by claim 1" (App. Br. 12). We are not persuaded since the Examiner is relying on the inherent properties of cycloolefin polymers. Appellants have not provided any probative, reviewable evidence which demonstrates that Natsuume's Zeonex cycloolefin polymer would not inherently satisfy the requirements of Claim 1. Appellants' Specification supports the Examiner's reasoning that Natsuume's Zeonex would function as claimed, since the Specification teaches that "[i]f the aforementioned synthetic resins are viewed from the point of suppressing the conversion ratio R from the p-polarized component to the s-polarized component, then 'ZEONEX 330R', 'ZEONOR', and "ABERU' are more preferable than PMMA" (Spec. 37, ll. 19-23). Thus, the Specification teaches that all of the cycloolefin polymers disclosed are superior in achieving the desired polarization (*see* Spec. 37, ll. 13-23).

Conclusion of Law

Appellants have not demonstrated that the Examiner erred in finding that a dielectric block formed from Natsuume's Zeonex polymer would inherently result in reduction of the intensity of an s-polarized component to 50% or less at an interface.

B. 35 U.S.C. § 102(e) over Naya

The Examiner finds that Naya discloses "a surface plasmon optical modulator element. The element comprises a dielectric block disposed so that light to be modulated travels through the interior of the dielectric block and impinges upon one surface thereof at an angle of total reflection, a metal film formed on one surface of the dielectric block, a photofunctional film formed on the metal film, and an oxygen cut film formed on the photofunctional film" (Ans. 6). The Examiner finds that Naya teaches that the "dielectric block can be composed of high refractive index glass or polycarbonate (i.e. a synthetic resin)" (Ans. 7).

Appellants argue that "the Examiner's failure to show the s-polarization characteristics in the prior art renders the rejection improper" (App. Br. 13). Appellants argue "that the Examiner has not carried the burden of maintaining the rejections" (App. Br. 13). Appellants argue that "[e]ven if one were to assume that some s-polarization suppression would occur in synthetic resin materials, there is no basis to conclude that the s-polarization would achieve the levels as claimed" (App. Br. 14).

In view of these conflicting positions, we frame the anticipation issue before us as follows:

Have Appellants demonstrated that the Examiner erred in finding that the dielectric block of Naya composed from polycarbonate would inherently result in reduction of the intensity of an s-polarized component to 50% or less at an interface?

Principles of Law

"[A] prima facie case of anticipation [may be] based on inherency." *In re King*, 801 F.2d 1324, 1327 (Fed. Cir. 1986). "[T]he examiner must provide some evidence or scientific reasoning to establish the reasonableness of the examiner's belief that the functional limitation is an inherent characteristic of the prior art" before the burden is shifted to Applicants to disprove the inherency. *Ex parte Skinner*, 2 USPQ2d 1788, 1789 (BPAI 1986).

Analysis

The Examiner argues "the polycarbonate material taught by Naya is a dielectric material and is considered to have the s-polarization properties recited in the claims" (Ans. 11). The Examiner argues that "[g]iven its broadest reasonable interpretation, any dielectric block should have the requisite s-polarization properties recited in claim 1" (Ans. 12).

We are not persuaded because the Examiner has not provided any specific reasoning which suggests that polycarbonate would have the required s-polarization characteristics other than the mere fact that it is a synthetic resin (*see* Ans. 6-7, 11-12). The Specification teaches that there are some difficulties in obtaining s-polarization (FF 3). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999).

Thus, unlike the obviousness rejections relying on Natsuume, where virtually identical materials are reasonably expected to yield identical results, the anticipation rejection over Naya uses a significantly different

synthetic resin, polycarbonate, for which no evidence is provided to show that it would have the required s-polarization properties.

Conclusion of Law

Appellants have demonstrated that the Examiner erred in finding that the dielectric block of Naya composed from polycarbonate would inherently result in reduction of the intensity of an s-polarized component to 50% or less at an interface.

SUMMARY

In summary, we affirm the rejection of claim 1 on the ground of nonstatutory obviousness type double patenting over claim 13 of Kubo and Natsuume. Pursuant to 37 C.F.R. § 41.37(c)(1)(vii)(2006), we also affirm the rejection of claims 2-6 and 14-18 as these claims were not argued separately.

We reverse the rejection of claims 1-3 under 35 U.S.C. § 102(e) as anticipated over Naya.

We affirm the rejection of claims 4-6 and 22-25 under 35 U.S.C. § 103(a) as obvious over Naya and Natsuume.

We affirm the rejection of claim 1 under 35 U.S.C. § 103(a) as obvious over Malmqvist and Natsuume. Pursuant to 37 C.F.R. § 41.37(c)(1)(vii)(2006), we also affirm the rejection of claims 2-12, 15-18, and 22-25 as these claims were not argued separately.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv)(2006).

AFFIRMED

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